motion, Lissajous' curves to those more advanced, as the transformations of Lagrange, the instantaneous motion of a solid body, the general theory of rolling motion.

The examples and applications are indeed numerous and well chosen throughout the 627 pages and represent the fruits of a life spent in the cultivation of this field. The co-authors consider the correspondence set up between line geometry and the point geometry on a sphere by means of the complex coordinates of a line to be the most interesting and original part of the work.

G. M. CONWELL

Höhere Algebra. By Helmut Hasse. Vol. I, *Lineare Gleichungen.* Sammlung Göschen. Berlin and Leipzig, Walter de Gruyter, 1926. 160 pp.

The author states in the introduction that the fundamental problem of algebra is the development of general methods by which equations, formed by the four elementary calculation operations from the known and unknown elements of a *Körper,* may be solved. This volume treats the solution of linear equations and volume II is to treat equations of higher degree.

In Chapter I the theory of *Körper* and *Integritätsbereiche* is developed, and rational and integral rational functions defined in relation to the elements of *Körper* and *Integritätsbereiche.* Chapter II contains the elements of the abstract theory of groups, developed in a manner analogous to the theory of *Körper.*

Chapters III and IV are devoted to the actual solution of the problem. Chapter III contains a complete solution from the theoretical standpoint, namely, the Toeplitz treatment of linear equations. This method consists essentially in reducing the problem of the solution of a given system of linear equations, satisfying the necessary condition for solution, to that of the solution of an equivalent system of linearly independent equations for which the necessary condition is proved to be sufficient. A vector is defined in this chapter as the coefficients of a linear form, and a matrix as m vectors, each of which is n-membered. Chapter IV differs but little in the material included from the usual chapter on determinants and linear equations contained in elementary texts on the theory of equations. The treatment, owing to the excellent foundations laid in the first two chapters, is most rigorous. It is introduced by a brief treatment of permutation groups.

Notwithstanding the small size of this volume, the author sacrifices nothing of rigor and clarity to compactness. There are several sets of examples in the first two chapters; but, if the reader wishes to apply the theory, he is forced to look elsewhere for problems.

L. T. MOORE